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The United States of America



The Director of the United States Patent and Trademark Office

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth below, subject to the payment of maintenance fees as provided by law.

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Nicholas P. Godici

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NOTICE

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US006265373B1

(12) **United States Patent**
Oses et al.(10) **Patent No.:** US 6,265,373 B1
(45) **Date of Patent:** Jul. 24, 2001(54) **COMPOSITION COMPRISING A MIXTURE OF ALKOXYLATED MONO-, DI- AND TRIGLYCERIDES AND GLYCERINE**(75) **Inventors:** Maria Jose Bermejo Oses, Viladecans; Miguel Mundo Blanch, Gurb; Nuria Siscart Laguna; Pilar Castan Barberan, both of Barcelona; Josep Vilaret Ferrer, Santa Maria Martorelles, all of (ES)(73) **Assignee:** Kao Corporation S.A., Barbera de Valles (ES)(*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.(21) **Appl. No.:** 09/545,868(22) **Filed:** Apr. 7, 2000(30) **Foreign Application Priority Data**

Apr. 13, 1999 (EP) 99 106 233

(51) **Int. Cl. 7** C11D 1/825(52) **U.S. Cl.** 510/506(58) **Field of Search** 554/149, 151, 554/227, 169, 163; 510/506(56) **References Cited**

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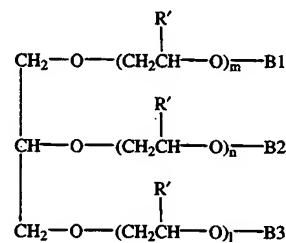
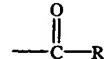
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Primary Examiner—John Hardee(74) **Attorney, Agent, or Firm**—Nath & Associates PLLC; Gary M. Nath; Jerald L. Meyer(57) **ABSTRACT**

The present invention relates to a composition comprising a mixture of alkoxylated mono-, di-, and triglycerides and glycerine of the following formula

R' representing H or CH₃, and each of m, n, and l independently representing a number from 0 to 4, the sum of m, n and l being in the range of from 1 to 4, each of B1, B2, and B3 representing H or

wherein R represents an alkyl or alkenyl group having 6 to 22 carbon atoms; and the weight ratio of triglyceride/diglyceride/monoglyceride being 46 to 90/9 to 35/1 to 15.

The invention also relates to methods for the preparation of this composition, to detergent compositions comprising this composition, and to the use of the composition as surfactant or co-surfactant in detergent compositions.

11 Claims, No Drawings

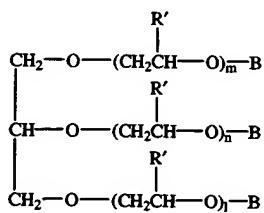
**COMPOSITION COMPRISING A MIXTURE
OF ALKOXYLATED MONO-, DI- AND
TRIGLYCERIDES AND GLYCERINE**

DESCRIPTION

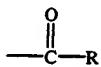
The present invention relates to a composition comprising a mixture of alkoxylated mono-, di-, and triglycerides and glycerine, to methods for the preparation of this composition, to detergent compositions comprising this composition, and to the use of the composition as surfactant or co-surfactant in detergent compositions.

Most of the known detergent compositions use anionic, amphoteric and/or non-ionic surfactants to obtain a final product showing satisfactory properties in terms of detergency and foam profile. However, most of these compositions are generally not satisfactory regarding the problem of ecotoxicity and the irritation to the eyes and the skin.

EP 0 586 323 B1 discloses detergent compositions showing improved properties regarding the ecotoxicity and the irritation to the eyes and to the skin. These compositions comprise the mono-, di- and tri-ester compounds represented by the following formula, wherein the weight ratio of mono-, di-, and tri-ester is 46-90/9-30/1-15:



wherein R' represents H or CH₃, B represents H or



wherein R represents an alkyl or alkenyl group having 6 to 22 carbon atoms, and each of m, n, and l may have a value between 0 to 40, the sum of m, n and l being in the range of from 2 to 100.

The viscosity of compositions disclosed in EP 0 586 323 B1 having a good foaming power is generally low. Although the viscosity may be increased when the alkoxylation degree is lowered, this is generally not preferred, since then the foaming power is also dramatically decreased. Therefore, a salt such as sodium chloride is generally added in order to increase the viscosity. However, adding a salt leads to an enhanced irritation of the skin and the eyes.

In view of this prior art it was the problem underlying the present invention to provide compositions showing a high viscosity and good foam stability, while also showing the good properties with respect to biodegradability and irritation to the eyes and the skin.

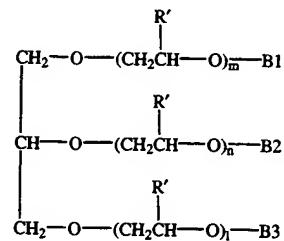
This problem is surprisingly solved by a composition comprising

- compounds represented by the following formula (I), wherein each of B1, B2 and B3 independently represent a group represented by the following formula (II);
- compounds represented by the following formula (I), wherein two of B1, B2 and B3 independently represent a group represented by the following formula (II), the remainder representing H;

(iii) compounds represented by the following formula (I), wherein one of B1, B2 and B3 represents a group represented by the following formula (II); the remainder representing H;

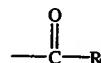
(iv) compounds represented by the following formula (I), wherein each of B1, B2 and B3 represent H; the weight ratio of the compounds (i)/(ii)/(iii) being 46 to 90/9 to 35/1 to 15:

Formula (I)



R' representing H or CH₃, and each of m, n, and l independently representing a number from 0 to 4, the sum of m, n and l being in the range of 1 to 4;

Formula (II):



wherein R represents an alkyl or alkenyl group having 6 to 22 carbon atoms.

The weight ratio of the compounds (i)/(ii)/(iii) in the composition of the present invention is preferably 60 to 83/16 to 35/1 to 6.

Particularly preferred are compounds of formula (I) wherein R' in formula (I) represents H, that is, the compounds are ethoxylated derivatives.

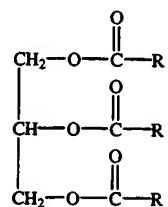
The sum of m, n and l in formula (I) is in the range of 1 to 4, preferably 1.5 to 3.0, more preferably in the range of 1.5 to smaller than 2.

The weight ratio (i)+(ii)+(iii)/(iv) is preferably in the range of 85/15 to 40/60, more preferably in the range 80/20 to 45/55.

The compositions of the present invention can be prepared by a first method comprising the following steps:

- Subjecting a mixture of glycerine and a compound of the following formula (III) to an interesterification reaction:

(III)



wherein R represents an alkyl or alkenyl group having 6 to 22 carbon atoms, and

- subjecting the reaction mixture obtained in step a) to an alkoxylation using an alkylene oxide having 2 or 3 carbon atoms in the presence of an alkaline catalyst.

The interesterification reaction in step a) is governed by statistics. Consequently, the molar ratio of the compounds